US 20140248955A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2014/0248955 A1

(43) Pub. Date: Sep. 4, 2014

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(54) **SERVICE CONTROLLER FOR SERVICING WAGERING GAME MACHINES**

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(21) Appl. No.: **14/279,029**

(22) Filed: **May 15, 2014**

Related U.S. Application Data

(63) Continuation of application No. 13/295,909, filed on Nov. 14, 2011, now Pat. No. 8,747,221, which is a continuation of application No. 12/293,371, filed on Feb. 12, 2009, now Pat. No. 8,075,397, filed as application No. PCT/US07/06696 on Mar. 16, 2007.

(60) Provisional application No. 60/743,521, filed on Mar. 17, 2006.

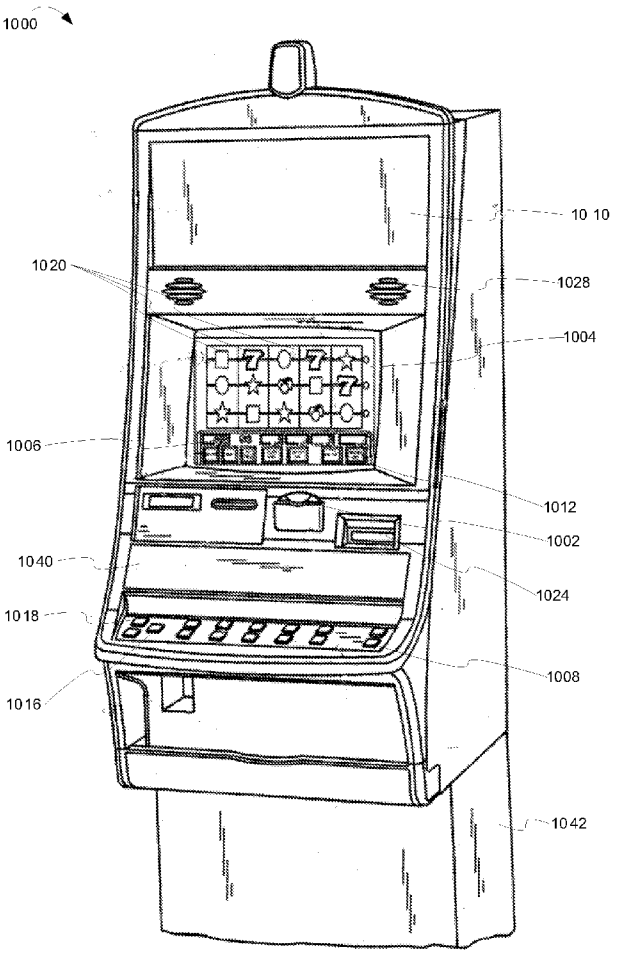
Publication Classification

(51) **Int. Cl.**
G07F 17/32 (2006.01)

(52) **U.S. Cl.**
CPC ***G07F 17/3209*** (2013.01)
USPC **463/31**

(57) **ABSTRACT**

Methods and apparatus for servicing wagering game machines are described herein. In one embodiment, the method includes receiving, over a wagering game network, service information originating from a wagering game machine, wherein the wagering game machine is configured to receive a wager associated with a wagering game. The method can also include, based on the service information and a service plan associated with the wagering game machine, determining a service action. The method can also include performing the service action.



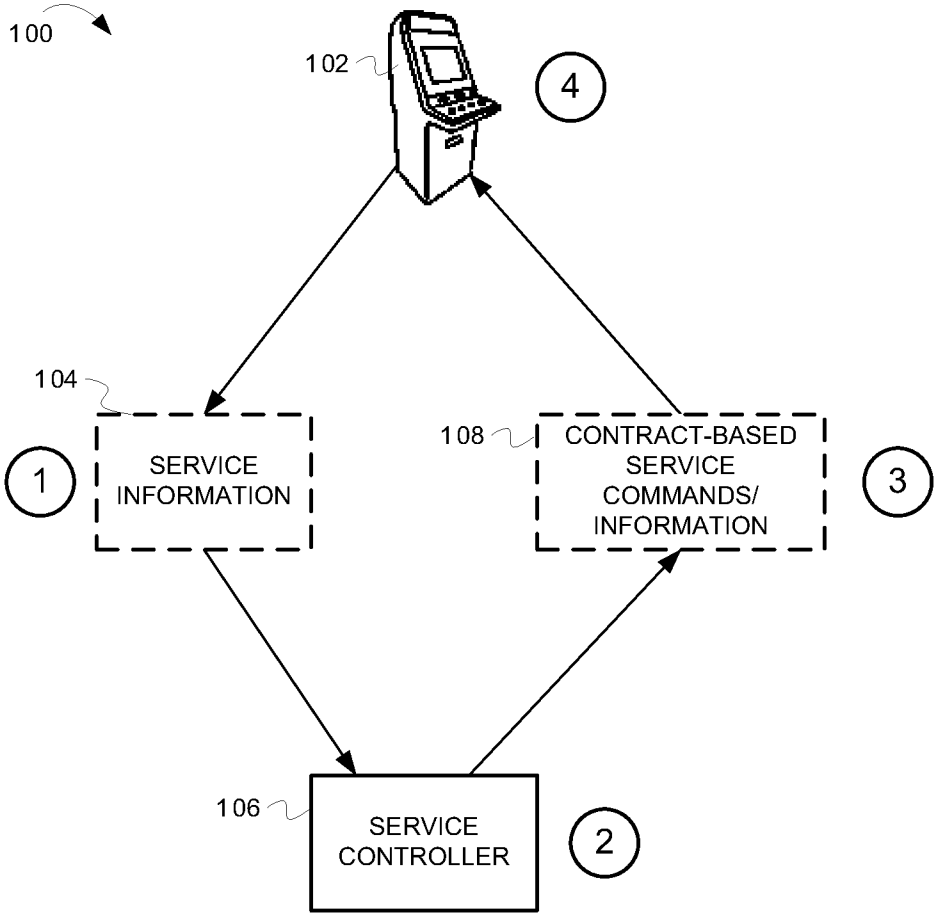

100
102
4
104
1
SERVICE INFORMATION
108
CONTRACT-BASED SERVICE COMMANDS/ INFORMATION
3
106
SERVICE CONTROLLER
2

FIG. 1

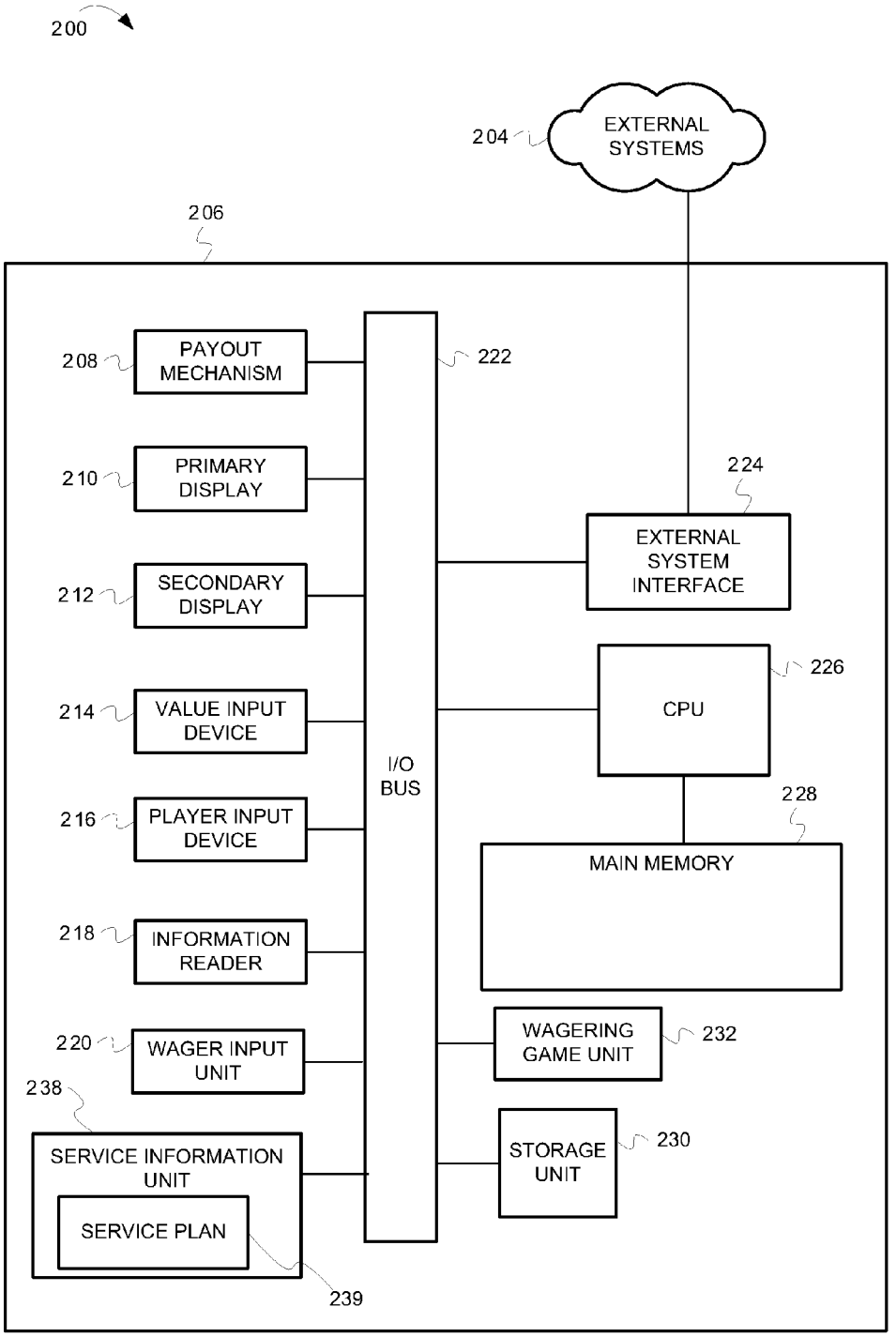

200
204
EXTERNAL SYSTEMS
206
208
PAYOUT MECHANISM
210
PRIMARY DISPLAY
212
SECONDARY DISPLAY
214
VALUE INPUT DEVICE
216
PLAYER INPUT DEVICE
218
INFORMATION READER
220
WAGER INPUT UNIT
238
SERVICE INFORMATION UNIT
SERVICE PLAN
239
I/O BUS
222
224
EXTERNAL SYSTEM INTERFACE
226
CPU
228
MAIN MEMORY
WAGERING GAME UNIT
232
STORAGE UNIT
230

FIG. 2

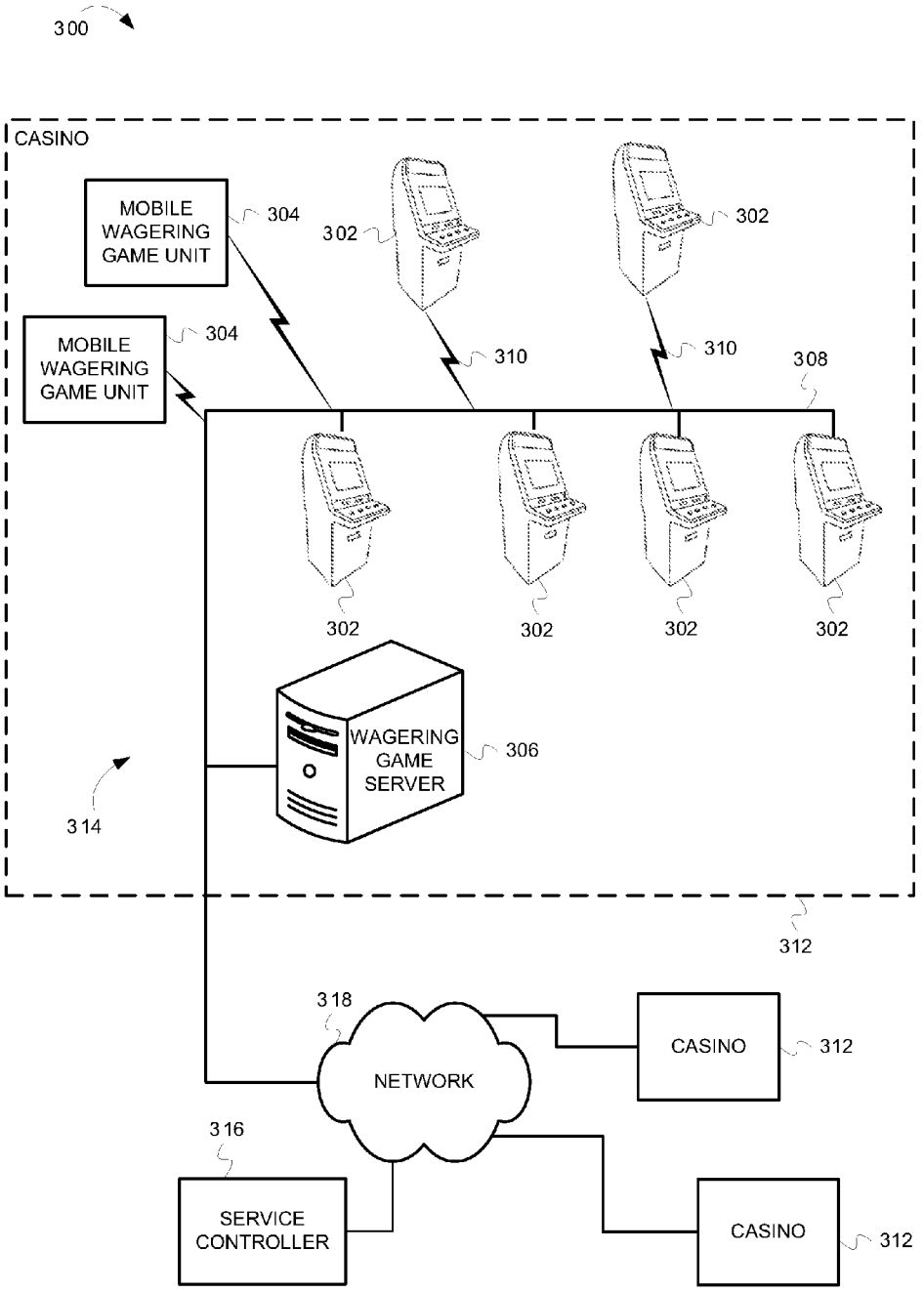

300
CASINO
MOBILE WAGERING GAME UNIT
304
MOBILE WAGERING GAME UNIT
304
302
302
310
310
308
302
302
302
302
WAGERING GAME SERVER
306
314
312
318
NETWORK
CASINO
312
316
SERVICE CONTROLLER
CASINO
312

FIG. 3

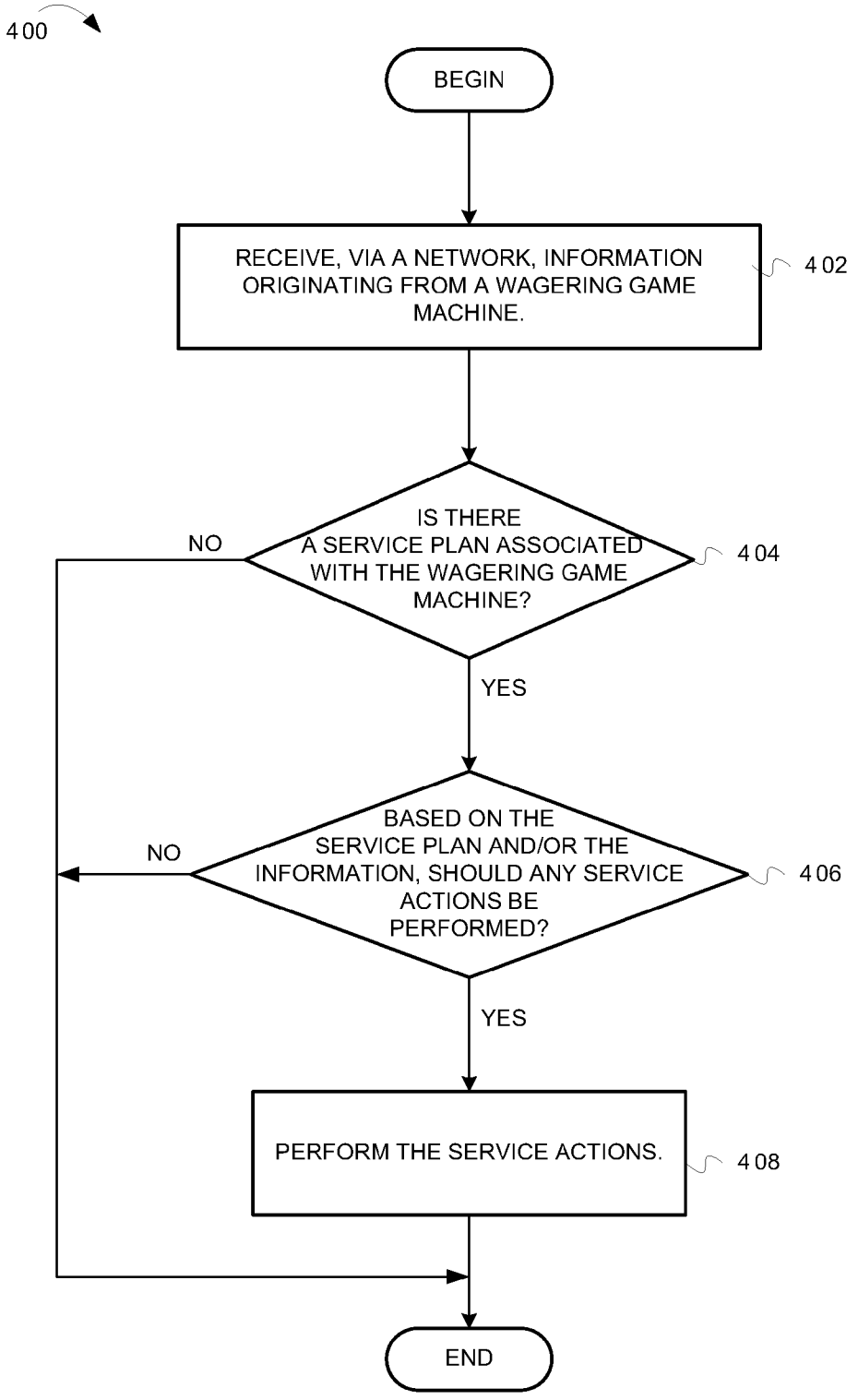

400
BEGIN
RECEIVE, VIA A NETWORK, INFORMATION ORIGINATING FROM A WAGERING GAME MACHINE.
402
IS THERE A SERVICE PLAN ASSOCIATED WITH THE WAGERING GAME MACHINE?
404
NO
YES
BASED ON THE SERVICE PLAN AND/OR THE INFORMATION, SHOULD ANY SERVICE ACTIONS BE PERFORMED?
406
NO
YES
PERFORM THE SERVICE ACTIONS.
408
END

FIG. 4

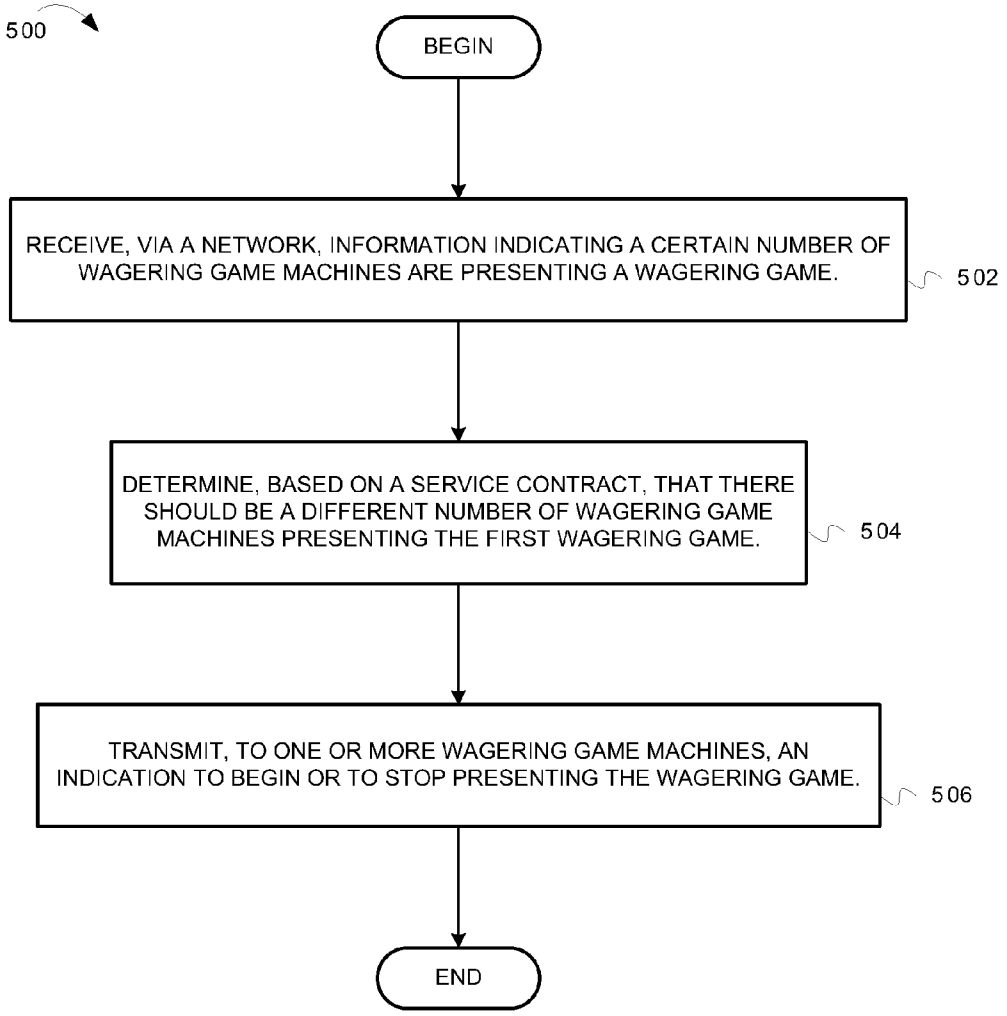

500
BEGIN
RECEIVE, VIA A NETWORK, INFORMATION INDICATING A CERTAIN NUMBER OF WAGERING GAME MACHINES ARE PRESENTING A WAGERING GAME.
502
DETERMINE, BASED ON A SERVICE CONTRACT, THAT THERE SHOULD BE A DIFFERENT NUMBER OF WAGERING GAME MACHINES PRESENTING THE FIRST WAGERING GAME.
504
TRANSMIT, TO ONE OR MORE WAGERING GAME MACHINES, AN INDICATION TO BEGIN OR TO STOP PRESENTING THE WAGERING GAME.
506
END

FIG. 5

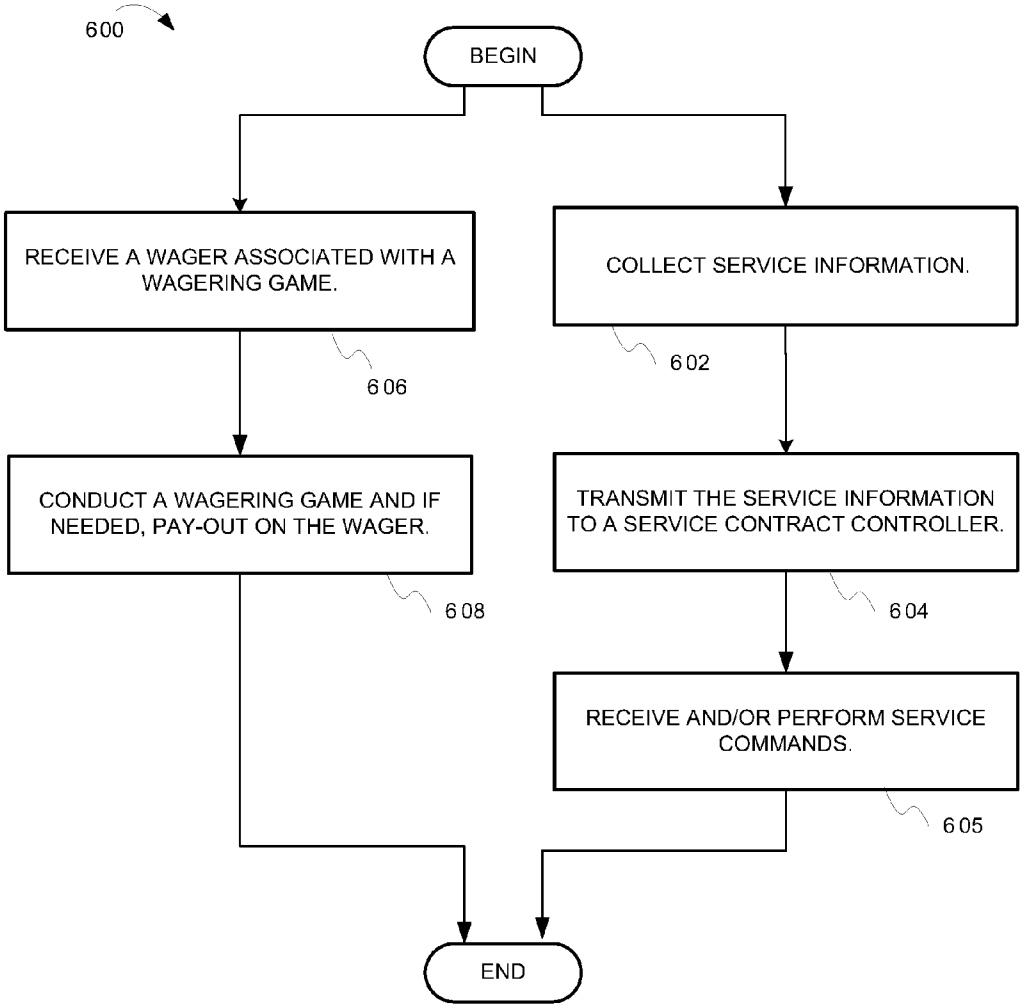

600
BEGIN
RECEIVE A WAGER ASSOCIATED WITH A WAGERING GAME.
606
COLLECT SERVICE INFORMATION.
602
CONDUCT A WAGERING GAME AND IF NEEDED, PAY-OUT ON THE WAGER.
608
TRANSMIT THE SERVICE INFORMATION TO A SERVICE CONTRACT CONTROLLER.
604
RECEIVE AND/OR PERFORM SERVICE COMMANDS.
605
END

FIG. 6

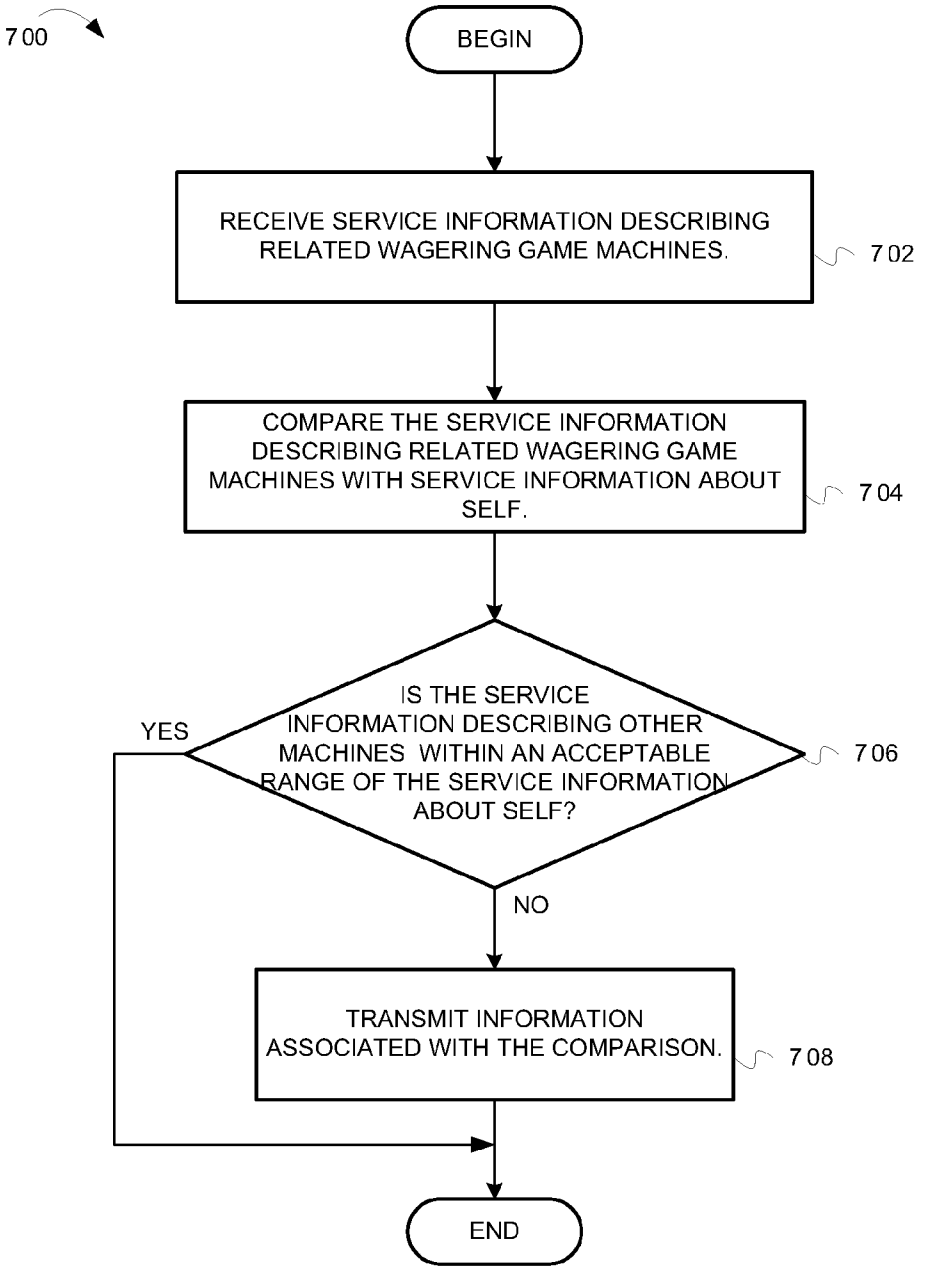

700
BEGIN
RECEIVE SERVICE INFORMATION DESCRIBING RELATED WAGERING GAME MACHINES.
702
COMPARE THE SERVICE INFORMATION DESCRIBING RELATED WAGERING GAME MACHINES WITH SERVICE INFORMATION ABOUT SELF.
704
IS THE SERVICE INFORMATION DESCRIBING OTHER MACHINES WITHIN AN ACCEPTABLE RANGE OF THE SERVICE INFORMATION ABOUT SELF?
706
YES
NO
TRANSMIT INFORMATION ASSOCIATED WITH THE COMPARISON.
708
END

FIG. 7

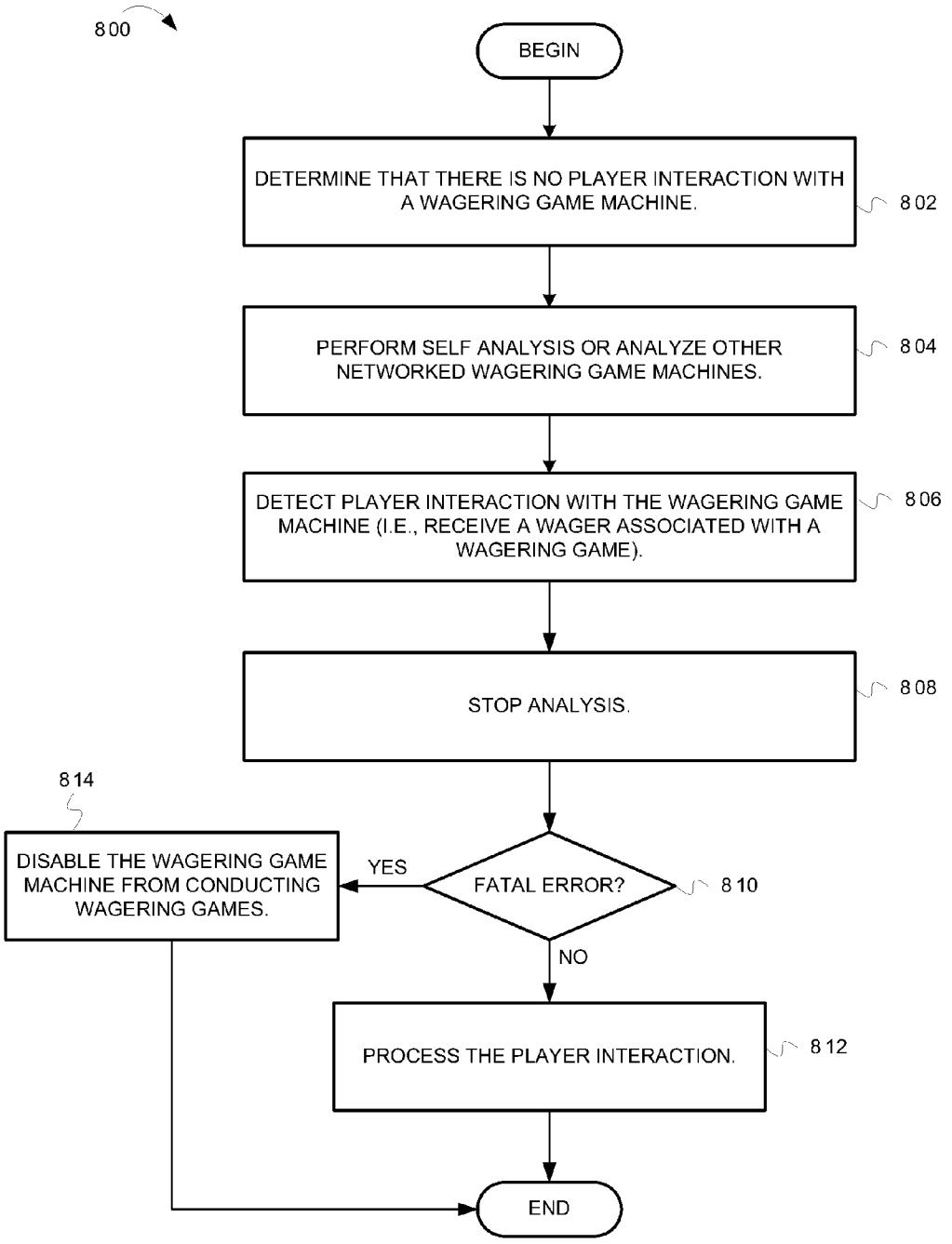

800
BEGIN
DETERMINE THAT THERE IS NO PLAYER INTERACTION WITH A WAGERING GAME MACHINE.
802
PERFORM SELF ANALYSIS OR ANALYZE OTHER NETWORKED WAGERING GAME MACHINES.
804
DETECT PLAYER INTERACTION WITH THE WAGERING GAME MACHINE (I.E., RECEIVE A WAGER ASSOCIATED WITH A WAGERING GAME).
806
STOP ANALYSIS.
808
814
DISABLE THE WAGERING GAME MACHINE FROM CONDUCTING WAGERING GAMES.
YES
FATAL ERROR?
810
NO
PROCESS THE PLAYER INTERACTION.
812
END

FIG. 8

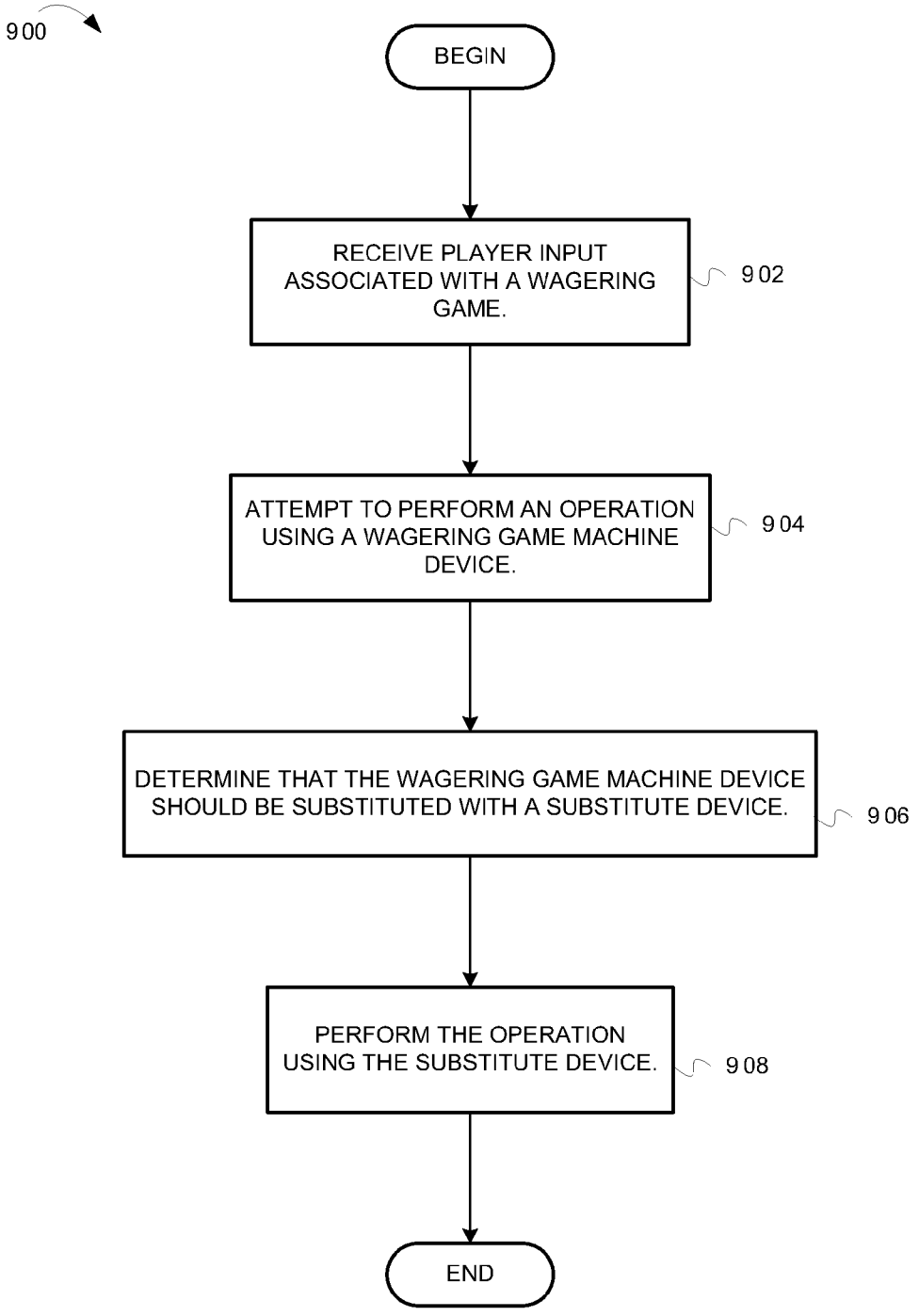

900
BEGIN
RECEIVE PLAYER INPUT ASSOCIATED WITH A WAGERING GAME.
902
ATTEMPT TO PERFORM AN OPERATION USING A WAGERING GAME MACHINE DEVICE.
904
DETERMINE THAT THE WAGERING GAME MACHINE DEVICE SHOULD BE SUBSTITUTED WITH A SUBSTITUTE DEVICE.
906
PERFORM THE OPERATION USING THE SUBSTITUTE DEVICE.
908
END

FIG. 9

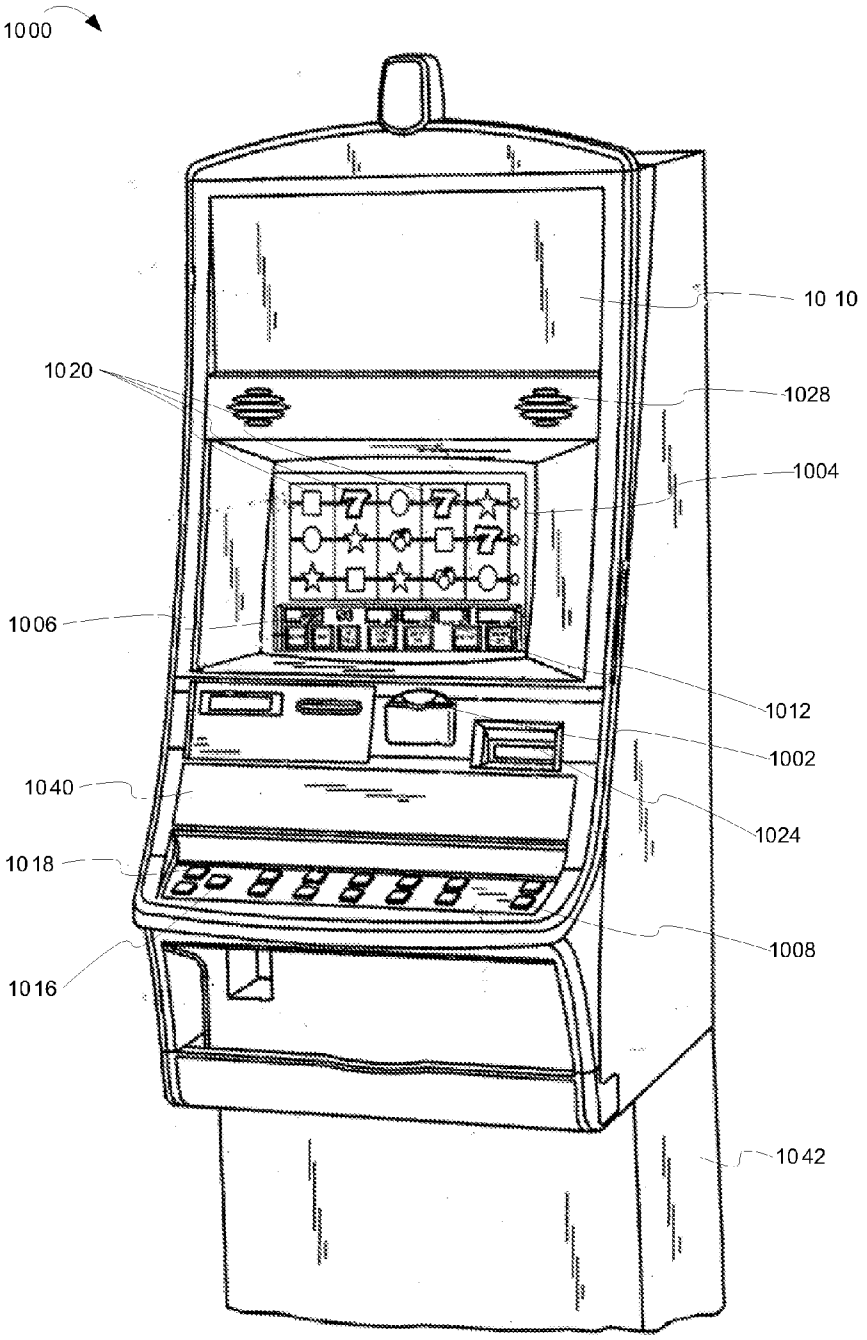

1000
1010
1020
1028
1004
1006
1012
1002
1040
1024
1018
1008
1016
1042

FIG. 10

SERVICE CONTROLLER FOR SERVICING WAGERING GAME MACHINES

RELATED APPLICATION

[0001] This patent application is a continuation of U.S. patent application Ser. No. 12/293,371, filed Feb. 12, 2009, which is a U.S. National Stage Filing under 35 U.S.C. 371 from International Patent Application Ser. No. PCT/US2007/006696, filed Mar. 16, 2007, and published on Sep. 27, 2007, as WO 2007/109168 A2 and republished as WO 2007/109168 A3, which claims the priority benefit of U.S. Provisional Patent Application Ser. No. 60/743,521 filed Mar. 17, 2006 and entitled "SERVICE CONTROLLER FOR SERVICING WAGERING GAME MACHINES", the contents of which are incorporated herein by reference in their entireties.

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FIELD

[0003] This invention relates generally to the field of wagering game machines and more particularly to the field of troubleshooting and servicing wagering game machines.

BACKGROUND

[0004] A wide variety of computerized wagering game machines are now available to casino operators and players. Computerized wagering game machines range from slot machines to games that are traditionally played live, such as poker, blackjack, roulette, etc. These wagering game machines provide many benefits to game owners and players, including increased reliability over mechanical machines, greater game variety, improved sound and animation, and lower overall management cost.

[0005] When technicians initially deploy wagering game machines for use in casinos, they typically manually wire the machines into wagering game networks and manually configure numerous settings. For example, the technicians may configure settings such as currency denominations for bill validators, screen resolution for video displays, volume for an audio devices, etc. Technicians often configure gaming machine settings by toggling DIP switches, moving expansion board jumpers, setting various dials and knobs, and paging through complicated set-up menus.

[0006] After deploying the wagering game machines into operation, technicians typically expend considerable efforts maintaining and repairing the machines. Technicians often utilize a variety of resources, such as service manuals and schematics, to facilitate the maintenance/repair process. However, despite these resources, even the most experienced technicians have difficulties maintaining and repairing wagering game machines in the field. Additionally, the maintenance/repair process can be complicated by a need for specialized tools and replacement parts.

BRIEF DESCRIPTION OF THE FIGURES

[0007] The present invention is illustrated by way of example and not limitation in the Figures of the accompanying drawings in which:

[0008] FIG. **1** is a dataflow diagram illustrating dataflow attendant to operations for remotely servicing wagering game machines, according to example embodiments of the invention;

[0009] FIG. **2** is a block diagram illustrating a wagering game machine, according to example embodiments of the invention;

[0010] FIG. **3** is a block diagram illustrating a wagering game network, according to example embodiments of the invention;

[0011] FIG. **4** is a flow diagram illustrating operations for receiving service information and performing service actions, according to example embodiments of the invention;

[0012] FIG. **5** is a flow diagram illustrating operations for instructing a wagering game machine to conduct a particular wagering game, according to example embodiments of the invention;

[0013] FIG. **6** is a flow diagram illustrating operations for transmitting service information, according to example embodiments of the invention;

[0014] FIG. **7** is a flow diagram illustrating operations for collecting service information from other wagering game machines in a gaming network, according to example embodiments of the invention;

[0015] FIG. **8** is a flow diagram illustrating operations for scheduling a service analysis, according to example embodiments of the invention;

[0016] FIG. **9** is a flow diagram illustrating operations for performing wagering game operations using a substitute and wagering game machine device, according to example embodiments of the invention; and

[0017] FIG. **10** is a perspective view of a wagering game machine, according to example embodiments of the invention.

DESCRIPTION OF THE EMBODIMENTS

[0018] Methods and apparatus for servicing wagering game machines are described herein. This description of the embodiments is divided into five sections. The first section provides an introduction to embodiments of the invention. The second section describes example gaming device architectures, while the third section describes example operations performed by some embodiments of the gaming device architectures. The fourth section describes gaming machines and gaming network and the fifth section provides some general comments.

Introduction

[0019] This section introduces embodiments of the invention. In one embodiment, wagering game machines can electronically report varying types of service information to remotely located service controllers. The service controllers can analyze the service information along with service plans applicable to the wagering game machines. The service controllers can, based on the service information and service plans, take measures to repair/maintain the wagering game machines.

[0020] In one embodiment, the service controller can use general service information to determine that specific wager-

ing game machine components need service. For example, the service information can indicate how many maximum bets were made in a given time period. If the number of maximum bets is uncharacteristically low, the service controller can determine that the "max bets" button needs service. The service controller can determine how to service the "max bets" button based on a service plan (e.g., a service contract) covering the wagering game machine. The following discussion of FIG. **1** shows one embodiment of such a system.

[0021] FIG. **1** is a block diagram illustrating dataflow and operations for remotely servicing wagering game machines, according to example embodiments of the invention. As shown in FIG. **1**, the wagering game network **100** includes a wagering game machine **102** and service controller **106**.

[0022] The dataflow and operations may occur in four stages. At stage one, the wagering game machine **102** transmits service information **104** to the service controller **106**. The service information **104** can include raw data or summaries describing how often the machine has been used, the machine's performance, fault information, and/or any other information relevant to ascertaining whether the wagering game machine **102** needs service.

[0023] At stage two, the service controller **106** analyzes the service information **104** based on a service agreement covering the wagering game machine **102**. Using an electronic representation of the service agreement (not shown), the service controller **106** determines what service information and/or service commands it will send to the wagering game machine **102**. The service commands can include instructions for resetting the wagering game machine **102** and/or its components, recalibrating components, testing components, etc. The service commands can include service information, which can include human-readable service notes, service manual text, machine-specific maintenance logs, or other information useful in servicing the machine.

[0024] At stage three, the service controller transmits the service commands **108** to the wagering game machine **102**.

[0025] At stage four, the wagering game machine **102** performs the service commands and/or stores the service information. If additional services are needed, the wagering game machine **102** or the service controller **106** can inform technicians about what services have been performed and what services are needed. As a result, the service controller **106** can provide service, according to a service plan, to remotely located wagering game machines.

[0026] These and other features will be described in more detail below. The next section describes example wagering game machines in more detail.

Example Operating Environment

Example Wagering Game Machine Architecture

[0027] FIG. **2** is a block diagram illustrating a wagering game machine, according to example embodiments of the invention. As shown in FIG. **2**, the wagering game machine **206** includes a central processing unit (CPU) **226** connected to main memory **228**.

[0028] The CPU **226** is also connected to an input/output (I/O) bus **222**, which facilitates communication between the wagering game machine's components. The I/O bus **222** is connected to a wagering game unit **232**. In one embodiment, the wagering game unit **232** can receive wagers and conduct wagering games, such as video poker, video black jack, video slots, video lottery, etc. The I/O bus **222** is also connected to a service information unit **238**, which includes an electronic service plan **239**. In one embodiment, the service information unit **238** collects and analyzes service information and carries out service operations.

[0029] The I/O bus **222** is also connected to a payout mechanism **208**, primary display **210**, secondary display **212**, value input device **214**, player input device **216**, information reader **218**, storage unit **230**, and service information unit **238**, which includes a service plan **239**. The I/O bus **222** is also connected to an external system interface **224**, which is connected to external systems **204** (e.g., wagering game networks).

[0030] In one embodiment, the wagering game machine **206** can include additional peripheral devices and/or more than one of each component shown in FIG. **2**. For example, in one embodiment, the wagering game machine **206** can include external system interfaces **224** and multiple CPUs **226**. In one embodiment, any of the components can be integrated or subdivided. Additionally, the components of the wagering game machine **206** can be interconnected according to any suitable interconnection architecture (e.g., directly connected, hypercube, etc.).

[0031] In one embodiment, any of the components of the wagering game machine **206** (e.g., service information unit **238**) can be embodied as hardware, firmware, and/or software for performing the operations described herein. For example, in an alternative to the embodiment shown in FIG. **2**, the service information unit **238** can be software stored in the main memory **228** and executed by the CPU **226**. Any of the wagering game machine's components can include machine-readable media including instructions for causing a machine to perform the operations described herein. Machine-readable media includes any mechanism that provides (i.e., stores and/or transmits) information in a form readable by a machine (e.g., a wagering game machine, computer, etc.). For example, tangible machine-readable media includes read only memory (ROM), random access memory (RAM), magnetic disk storage media, optical storage media, flash memory machines, etc. Machine-readable media also includes any media suitable for transmitting software over a network.

[0032] While FIG. **2** describes example embodiments of a wagering game machine, FIG. **3** shows how a plurality of wagering game machines can be connected in a network.

Example Wagering Game Network

[0033] FIG. **3** is a block diagram illustrating a wagering game network, according to example embodiments of the invention. As shown in FIG. **3**, the wagering game network **300** includes a plurality of casinos **312** and a service controller **316** connected to a communications network **318**. Each of the plurality of casinos **312** includes a local area network **314**, which includes a wagering game server **306**, mobile wagering game units **304**, and wagering game machines **302**. Although not shown in FIG. **3**, each casino **312** can include a service controller **316**. In one embodiment, the wagering game server **306** serves wagering games and/or distributes wagering game content over the local area network **314**. The wagering game server **306**, mobile wagering game unit **304**, and wagering game machines **302** can include hardware and machine-readable media including instructions for transmitting service-related information to the service controller **316**. In one embodiment, the service controller **316** receives the service

information and determines service actions based on the information and service plans applicable to the wagering game machines **302**.

[0034] The service information can include information about any component of a wagering game machine **302** or mobile wagering game unit **304**, such as a CPU **226**, main memory **228**, peripheral device, software program, etc. Additionally, the service information can include information about machines on the local area network **314**, such as the wagering game server **306**. For example, the service information can include information indicating component utilization, repair codes, failure information, component sensor readings (e.g., printer's print head temperature sensor, printer's paper tray sensor, etc.), etc. The service information can also include information about other wagering game machines **302** and/or mobile wagering game units **304** in the local area network **314**. Additionally, the service information can include information about player inputs, player information, wagering game outcomes, or any other information that can be used in determining a wagering game machine's service status.

[0035] In one embodiment, the service controller **316** can use the service information to deduce that a machine is experiencing technical difficulties. For example, the service information may indicate that an unusually low number of $**5** bills has been received by the value input device **214**. Although, in this example, the service information does not include any data directly indicating a fault in the value input device **214**, the service controller **316** can compare parameters in the service information to expected parameter values. If the values are outside of an acceptable range, the service controller **316** can take service actions prescribed in a service plan associated with the wagering game machine and/or the value input device **214**. Embodiments of the service controller **316** can use the service information to deduce maintenance needs for any component of the wagering game machines **302**, mobile wagering game unit **304**, and wagering game server **306**.

[0036] In one embodiment, the wagering game machines **302** can, alone or in concert with the service controller **316**, detect hardware/software faults and isolate faulty components. After detecting faults, the wagering game machines **302** and/or service controller **316** can analyze the faults to determine what service actions may fix the faults. In one embodiment, the service controller **316** can remotely initiate services, whereas in another embodiment, the wagering game machines **302** initiate service operations on their own.

[0037] The wagering game machines described herein can take any suitable form, such as floor standing models, handheld mobile units, bartop models, workstation-type console models, etc. In one embodiment, the wagering game network **300** can include other network devices, such as accounting servers, wide area progressive servers, and/or other devices suitable for use in connection with embodiments of the invention.

[0038] The components of each casino **312** can communicate over wired **308** and/or wireless connections **310**. Furthermore, they can employ any suitable connection technology, such as Bluetooth, the IEEE 802 communication protocol family, Ethernet, public switched telephone networks, SONET, etc.

[0039] While the discussion of FIGS. **2** and **3** describes wagering game machines and wagering game networks, the next section describes example operations performed by components of a wagering game network.

Operations

[0040] This section describes operations performed by embodiments of the invention. In the discussion below, the flow diagrams will be described with reference to the block diagrams presented above. In certain embodiments, the operations are performed by instructions residing on machine-readable media (e.g., software), while in other embodiments, the operations are performed by hardware and/or other logic.

[0041] FIGS. **4-9** are discussed below. FIGS. **4** and **5** describe operations for receiving and processing service information, while FIGS. **6-9** describe operations for collecting and transmitting service information. This description will proceed with a discussion of FIG. **4**.

[0042] FIG. **4** is a flow diagram illustrating operations for receiving service information and performing service actions, according to example embodiments of the invention. Flow diagram **400** commences at block **402**.

[0043] At block **402**, service information originating from a wagering game machine is received over a network. For example, the service controller **316** receives service information from a wagering game machine **302**. The flow continues at block **404**.

[0044] At block **404**, a determination is made about whether there is a service plan associated with the wagering game machine. For example, service controller **316** determines whether there is a service plan associated with the wagering game machine **302**. In one embodiment, the service controller **316** searches a database or other data store for a service plan associated with the wagering game machine **302**. In one embodiment, the service plan enumerates services to be performed by the service controller **316**. The service plan can be part of a service contract or other agreement between a wagering game machine operator and a service provider. If there is a service plan associated with the wagering game machine, the flow continues at block **406**. Otherwise, the flow ends.

[0045] At block **406**, a determination is made about whether service actions should be performed, where the determination is based on the service plan and the service information. For example, the service controller **316** determines, based on the service plan and information, whether to perform service actions. The service controller **316** can make the determination according to different criteria. In one embodiment, the service controller **316** can inspect the service information for indicia (e.g., service codes) explicitly indicating that particular services are needed by components of a wagering game machine **302**. Alternatively, the service controller **316** can deduce, based on the service information, whether service actions should be taken (see discussion of FIG. **3**). In one embodiment, the service controller **316** records and analyzes the service information. Such analysis can include comparing frequencies with which error messages are received from different wagering game machines **302**. If the errors are occurring more frequently in some wagering game machines **302**, the service controller **316** may determine that service actions are required for those wagering game machines **302**. If service actions should be performed, the flow continues at block **408**. Otherwise, the flow ends.

[0046] At block **408**, the service actions are performed. For example, the service controller **316** performs service opera-

tions based on the service information and service plan associated with the wagering game machine **302**. The service actions can include transmitting appropriate portions of a service manual to a wagering game machine **302**, so technicians can use the service manual in servicing the wagering game machine **302**. The actions can also include transmitting reboot commands, scheduling a wagering game machine for maintenance, communicating instructions to a technician, and remotely accessing any of a wagering game machine's addressable storage locations, such as locations in BIOS (not shown), main memory **228**, storage unit **230**, or any peripheral device. From block **408**, the flow ends.

[0047] This description continues with FIG. **5**, which describes additional service actions. In particular, FIG. **5** describes operations for ensuring that a particular wagering game is being presented on a predetermined number of wagering game machines. For example, the operations of FIG. **5** can be used to ensure that each casino **312** always (or almost always) has Jackpot Party® games running on at least three wagering game machines **302**.

[0048] FIG. **5** is a flow diagram illustrating operations for instructing a wagering game machine to conduct a particular wagering game, according to example embodiments of the invention. The flow diagram **500** commences at block **502**.

[0049] At block **502**, information is received over a network, where the information indicates that a certain number of wagering game machines are presenting a particular wagering game. For example, the service controller **316** receives service information from the wagering game machines **302**, where the service information indicate that three (or any other suitable number) of the wagering game machines **302** are presenting a particular wagering game, such as Jackpot Party® or Monopoly®-based slots. The number of wagering game machines **302** presenting the particular wagering game may fluctuate over time because of component failures or other service needs. The flow continues at block **504**.

[0050] At block **504**, a determination is made, based on a service plan, about how many wagering game machines should be presenting the particular wagering game. For example, the service controller **316** looks-up and inspects an electronic representation of a service plan associated with the wagering game machines **302**. Based on the service plan, the service controller **316** determines how many (e.g., 3, 4, or any suitable number) wagering game machines **302** should be presenting the particular wagering game. The flow continues at block **506**.

[0051] At block **506**, an indication is transmitted to one or more wagering game machines, where the indication instructs the wagering game machine(s) to begin/cease presenting a particular wagering game. For example, the service controller **316** instructs a wagering game machine **302** to begin presenting a particular wagering game. In one embodiment, the indication causes the wagering game machine **302** to switch between different wagering games. For example, the wagering game machine may be presenting a Monopoly®-based slots game before switching to Jackpot Party®, as a result of an indication from the service controller **316**. From block **506**, the flow ends.

[0052] While the discussion of FIGS. **4** and **5** describes operations for processing service information and performing service actions, FIGS. **6-9** will describe operations collecting and transmitting service information and carrying-out service actions. This description will continue with FIG. **6**.

[0053] FIG. **6** is a flow diagram illustrating operations for transmitting service information, according to example embodiments of the invention. The flow diagram **600** commences at blocks **602** and **606**. In one embodiment, the operations of flow **600** can be performed in parallel. In another embodiment, the operations can be performed sequentially or in an interleaved fashion.

[0054] At block **602**, service information is collected. For example, a wagering game machine's service information unit **238** collects service information. As noted above (see discussion of FIG. **3**), the service information **238** can include any information that directly or indirectly indicates service states of a wagering game machine's components. In one embodiment, the service information unit **238** receives status information from one or more of the wagering game machine's peripheral devices (e.g., the ticket printer **216**, payout mechanism **208**, etc). The service information unit **238** can also collect service information about hardware and software that are not part of the wagering game machine's peripheral devices. For example, the service information unit **238** can receive service information from the wagering game machine's operating system (not shown), where the information indicates service states of a hard disk drive (not shown), expansion card (not shown), main memory **228**, or other device. In one embodiment, the service information unit **238** can collect service information set forth in a service plan covering the wagering game machine **302**. In one embodiment, a representation of the service plan is stored on the wagering game machine **302** (see service plan **239** of FIG. **2**). The flow continues at block **604**.

[0055] At block **604**, the service information is transmitted to a service controller. For example, the wagering game machine **302** transmits the service information through the external interface **224** to the service controller **316**. In one embodiment, the wagering game machine transmits the service information to the service controller **316** in response to the service controller's request (not shown) for the service information. In another embodiment, the wagering game machine **302** transmits the service information to a repository (not shown) accessible to the service controller **316**. The flow continues at block **605**.

[0056] At block **605**, service commands are received and/or performed. For example, the service information unit **238** receives service commands from the service controller **316**. The service information unit **238** can carry-out the service commands. In one embodiment, the service information unit **238** itself carries-out the service commands. In another embodiment, the service information unit **238** forwards the service commands to the CPU **226** for execution. As noted above, the commands can include reboot commands, reset commands, cycle commands, clear commands, and commands for accessing addressable memory locations and returning data to the service controller **316**, etc. The service information unit **238** can perform the service commands immediately or it can wait until later (e.g., until after a wagering game is complete and all wagers are paid).

[0057] In one embodiment, the service information unit **238** does not receive service commands from the service controller **316**. Instead, service information unit **238** itself analyzes the service information and performs service commands, such as "tilting" the wagering game machine **302** or disabling wagering game machine components. From block **605**, the flow ends.

[0058] At block **606**, a wager is received in association with a wagering game. For example, the wagering game machine **302** receives a wager through its player input device **216** value input device **214**. The flow continues at block **608**.

[0059] At block **608**, the wagering game is conducted and, if needed, a wager is paid. For example, the wagering game machine's wagering game unit **232** conducts the wagering game (e.g., slots, video poker, video blackjack, etc.) and, if needed, pays-out the wager. From block **608**, the flow ends.

[0060] The description continues with FIG. **7**, which describes how wagering game machines can collect service information from other wagering game machines in a gaming network.

[0061] FIG. **7** is a flow diagram illustrating operations for collecting service information from wagering game machines in a gaming network, according to example embodiments of the invention. The flow diagram **700** begins at block **702**.

[0062] At block **702**, service information about other wagering game machines is received. For example, a wagering game machine **302** receives service information from a neighboring wagering game machine. In one embodiment, the service information originates from and describes one or more wagering game machines in close spatial proximity to the wagering game machine **302**. In one embodiment, the service information can describe wagering game machines that not in close spatial proximity, but that are related in some other way, such as having identical or similar game themes, components, configurations, operating times, etc. The flow continues at block **704**.

[0063] At block **704**, the service information about other wagering game machines is compared to service information about the machine performing flow **600**. For example, the wagering game machine's service information unit **238** compares the service information describing other wagering game machines with the service information describing the wagering game machine **302**. The flow continues at block **706**.

[0064] At block **706**, a determination is made about whether the other service information is within an acceptable range. For example, the service information unit **238** determines whether the service information describing the other machines is within an acceptable range of the service information describing the wagering game machine **302**. If the service information is not with an acceptable range, the flow continues at block **708**. Otherwise, the flow continues at block **708**.

[0065] At block **708**, information associated with the comparison is transmitted. For example, the service information unit **238** transmits information about the comparison to the service controller **316**. In one embodiment, the information can include statistics indicating how far out of range the service information is. For example, the service information can indicate that temperatures are 30% higher than normal, particular buttons have been pressed with 50% higher frequently than normal, pay-outs have been 5% higher than normal, etc.

[0066] Although the operations of the flow **700** can be performed by embodiments of a wagering game machine, the service controller **316** can perform similar operations. For example, in one embodiment, the service controller **316** can compare service information collected from a set of wagering game machines with the service information of an individual wagering game machine. The service controller **316** can take service actions based on the comparisons. For example, if a wagering game machine received significantly fewer "max bets" than other machines in close spatial proximity, the service controller **316** could notify service technicians that the machine's "max bet" button may have failed or the service controller **316** could reposition the "max bet" button on the machine's configurable button panel.

[0067] This description continues with FIG. **8**.

[0068] FIG. **8** is a flow diagram illustrating operations for scheduling a service analysis, according to example embodiments of the invention. The flow diagram **800** begins at block **802**.

[0069] At block **802**, it is determined that there is no player interaction with a wagering game machine. For example, a wagering game machine's wagering game unit **232** determines that a player is not currently interacting with the wagering game machine **302**. Player interaction can include inserting monetary value, activating input devices, playing a wagering game, etc. The flow continues at block **804**.

[0070] At block **804**, a self analysis is performed on service information. For example, the service information unit **238** analyzes its own service information or service information describing with other wagering game machines. The analysis can include statistically analyzing the service information to determine whether it falls within acceptable ranges, comparing service information between wagering game machines, etc. The analysis performed at block **804** can reveal component failures or indicate that components need specific services. The flow continues at block **806**.

[0071] At block **806**, player interaction is detected. For example, the wagering game unit **232** detects that a player is interacting with the wagering game machine **302**. Player interaction can include receiving value (e.g., money or credit), pressing buttons to view wager gaming information, etc. The flow continues at block **808**.

[0072] At block **808**, the analysis is stopped. For example, the service information unit **238** stops analyzing service information. The flow continues at block **810**.

[0073] At block **810**, there is a determination about whether a fatal error has been discovered during the analysis. Fatal errors can include hardware and/or software faults, such as faults in Non-volatile Random Access Memory. If a fatal error has been discovered, the process continues at block **814**. Otherwise, the flow **800** continues at block **812**.

[0074] At block **812**, the player interaction is processed. For example, the wagering game unit **232** processes a player interaction. In one embodiment, processing the player interaction can include receiving monetary or player input, such as button or touch screen input. Processing the player interaction can also include conducting a wagering game (e.g., video slots, video poker, etc.) based on the player input. The flow continues at block **812**. From block **812**, the flow ends.

[0075] At block **814**, the wagering game machine is disabled from conducting wagering games. For example, the service information unit **238** disables the wagering game machine's wagering game unit **232** from conducting wagering games. Although the wagering game unit **232** will not conduct wagering games, it and/or the service information unit **238** may report additional service information to the service controller **316** and perform service commands received from the service controller **316**. In one embodiment, after encountering a fatal error, the service information unit **238** informs the service controller **316** and/or presents an error message on the wagering game machine's primary display **210**. From block **814**, the flow ends.

[0076] While FIG. **8** describes operations for scheduling service information analyses, this description continues with FIG. **9**, which describes a failover technique that finds substitute components to perform wagering game operations.

[0077] FIG. **9** is a flow diagram illustrating operations for performing wagering game operations using a substitute wagering game machine device, according to example embodiments of the invention. The flow **900** commences at block **902**.

[0078] At block **902**, player input associated with a wagering game is received. For example, the wagering game unit **232** receives player input (e.g., a button press) through the player input device **216**. The player input can include wagers, game selections, etc. The flow continues at block **904**.

[0079] At block **904**, an attempt is made to perform an operation using a wagering game machine device. For example, the wagering game unit **232** (or the wagering game machine's operating system) attempts to present a player input screen on the primary display **210**. In one embodiment, the operation at block **904** occurs in response to the player input from block **902** or as a result of other operations occurring in the wagering game unit **232**. The flow continues at block **906**.

[0080] At block **906**, a determination is made that the wagering game machine device should be substituted with a substitute device. For example, the wagering game unit **232** (or operating system) recognizes that the primary display **210** is exhibiting a fault and selects the secondary display **212** to operate as a substitute device. In one embodiment, the wagering game unit **232** can select any suitable device in the wagering game machine **302** to be the substitute device. In one embodiment, the wagering game unit **232** can select devices that are not part of the wagering game machine **302**. For example, the wagering game unit **232** can select a processor in an adjacent sign controller (not shown) as a substitute for the CPU **226**. Similarly, the wagering game machine **302** can select CPUs of idle wagering game machines in the network **314**. The flow continues at block **908**.

[0081] At block **908**, the operation is performed using the substitute device. For example, the wagering game unit **232** presents the player input screen on the secondary display **212**. As noted above, in one embodiment, the substitute device can be any device of the wagering game machine **302** or other network devices, such as other wagering game machines on the local-area network **314**. From block **908**, the flow ends.

Wagering Game Devices and Wagering Game Networks

[0082] This section describes addition details of wagering game machines in which embodiments of the invention can be practiced.

Example Wagering Game Machine

[0083] FIG. **10** is a perspective view of a wagering game machine, according to example embodiments of the invention. As shown in FIG. **10**, the wagering game machine **1000** can be a computerized slot machine having the controls, displays, and features of a conventional slot machine.

[0084] The wagering game machine **1000** can be mounted on a stand **1042** or it can be constructed as a pub-style tabletop game (not shown). As a result, the wagering game machine **1000** can be operated while players are standing or seated. Furthermore, the wagering game machine **1000** can be constructed with varying cabinet and display designs. The wagering game machine **1000** can incorporate any primary game such as slots, poker, or keno, and additional bonus round games. The symbols and indicia used on and in the wagering game machine **1000** can take mechanical, electrical, or video form.

[0085] As illustrated in FIG. **10**, the wagering game machine **1000** includes a coin slot **1002** and bill acceptor **1024**. Players can place coins in the coin slot **1002** and paper money or ticket vouchers in the bill acceptor **1024**. Other devices can be used for accepting payment. For example, credit/debit card readers/validators can e used for accepting payment. Additionally, the wagering game machine **1000** can perform electronic funds transfers and financial transfers to procure monies from financial accounts. When a player inserts money in the wagering game machine **1000**, a number of credits corresponding to the amount deposited are shown in a credit display **1006**. After depositing the appropriate amount of money, a player can begin playing the game by pushing play button **1008**. The play button **1008** can be any play activator used for starting a wagering game or sequence of events in the wagering game machine **1000**.

[0086] As shown in FIG. **10**, the wagering game machine **1000** also includes a bet display **1012** and one or more "bet" buttons on the panel **1016**. The player can place a bet by pushing one or more of the bet buttons on the panel **1016**. The player can increase the bet by one or more credits each time the player pushes a bet button. When the player pushes a "bet one" button **1016**, the number of credits shown in the credit display **1006** decreases by one credit, while the number of credits shown in the bet display **1012** increases by one credit.

[0087] A player may end the gaming session or "cash-out" by pressing a cash-out button **1018**. When a player cashes-out, the wagering game machine **1000** dispenses a voucher or currency corresponding to the number of remaining credits. The wagering game machine **1000** may employ other payout mechanisms such as credit slips (which are redeemable by a cashier) or electronically recordable cards (which track player credits), or electronic funds transfer.

[0088] The wagering game machine also includes a primary display unit **1004** and a secondary display unit **1010** (also known as a "top box"). The wagering game machine may also include an auxiliary video display **1040**. In one embodiment, the primary display unit **1004** displays a plurality of video reels **1020**. According to embodiments of the invention, the display units **1004** and **1010** can include any visual representation or exhibition, including moving physical objects (e.g., mechanical reels and wheels), dynamic lighting, and video images. In one embodiment, each reel **1020** includes a plurality of symbols such as bells, hearts, fruits, numbers, letters, bars or other images, which correspond to a theme associated with the wagering game machine **1000**. Additionally, the wagering game machine **1000** also includes an audio presentation unit **1028**. The audio presentation unit **1028** can include audio speakers or other suitable sound projection devices.

[0089] In one embodiment, the wagering game machine **1000** can transmit service information and perform operations described above.

General

[0090] In this description, numerous specific details are set forth. However, it is understood that embodiments of the invention may be practiced without these specific details. In

other instances, well-known circuits, structures and techniques have not been shown in detail in order not to obscure the understanding of this description. Note that in this description, references to "one embodiment" or "an embodiment" mean that the feature being referred to is included in at least one embodiment of the invention. Further, separate references to "one embodiment" in this description do not necessarily refer to the same embodiment; however, neither are such embodiments mutually exclusive, unless so stated and except as will be readily apparent to those of ordinary skill in the art. Thus, the present invention can include any variety of combinations and/or integrations of the embodiments described herein. Each claim, as may be amended, constitutes an embodiment of the invention, incorporated by reference into the detailed description.

[0091] Herein, block diagrams illustrate example embodiments of the invention. Also herein, flow diagrams illustrate operations of the example embodiments of the invention. The operations of the flow diagrams are described with reference to the example embodiments shown in the block diagrams. However, it should be understood that the operations of the flow diagrams could be performed by embodiments of the invention other than those discussed with reference to the block diagrams, and embodiments discussed with references to the block diagrams could perform operations different than those discussed with reference to the flow diagrams. Additionally, some embodiments may not perform all the operations shown in a flow diagram. Moreover, although the flow diagrams depict serial operations, certain embodiments could perform certain of those operations in parallel.

1-3. (canceled)

4. A wagering game machine, comprising:

one or more wagering game machine devices including

a player input device configured to receive a player input for a wagering game, and

a display unit configured to display the wagering game; and

a wagering game unit configured to:

attempt performing an operation with at least one device of the one or more wagering game machine devices,

in response to a condition of the at least one device, determine that the at least one device should be substituted with a substitute device, and

perform the operation with the substitute device instead of with the at least one device.

5. The wagering game machine of claim **4**, wherein the player input is selected from a group consisting of a wager input and a game selection.

6. The wagering game machine of claim **4**, wherein the attempt of performing the operation is in response to receiving the player input.

7. The wagering game machine of claim **4**, wherein the attempt of performing the operation is in response to one or more other operations of the wagering game machine.

8. The wagering game machine of claim **4**, wherein the condition of the at least one device is a fault condition.

9. The wagering game machine of claim **4**, wherein the display unit is a primary display unit of the wagering game machine,

10. The wagering game machine of claim **4**, wherein the substitute device is selected from a group consisting of at least one other device of the one or more wagering game machine devices, at least one device of another wagering game machine, and at least one device of a network device communicatively coupled with the wagering game machine.

11. The wagering game machine of claim **4**, wherein the display unit is a primary display unit of the wagering game machine, the substitute device being a secondary display unit of the wagering game machine, and the condition being a fault condition of the primary display unit.

12. The wagering game machine of claim **4**, wherein the substitute device is selected from one or more idle wagering game machines that are communicatively coupled with the wagering game machine on a network.

13. A method performed by a wagering game machine, comprising:

receiving, via a player input device, a player input for a wagering game;

displaying the wagering game on a display unit;

attempting, via a wagering game unit, to perform an operation with at least one device of one or more wagering game machine devices, the one or more wagering game machine devices including at least the player input device and the display unit;

in response to a condition of the at least one device, determining, via the wagering game unit, that the at least one device should be substituted with a substitute device; and

performing the operation with the substitute device instead of with the at least one device.

14. The method of claim **13**, further comprising attempting to perform the operation, via the wagering game unit, in response to receiving the player input.

15. The method of claim **13**, further comprising attempting to perform the operation, via the wagering game unit, in response to one or more other operations of the wagering game machine.

16. The method of claim **13**, wherein the condition of the at least one device is a fault condition.

17. The method of claim **13**, wherein the substitute device is selected from a group consisting of at least one other device of the one or more wagering game machine devices, at least one device of another wagering game machine, and at least one device of a network device communicatively coupled with the wagering game machine.

18. The method of claim **13**, wherein the substitute device is selected from one or more idle wagering game machines that are communicatively coupled with the wagering game machine on a network.

19. A non-transitory machine-readable storage device including instructions which when executed by a particular wagering game machine cause the particular wagering game machine to perform operations comprising:

receiving, via a player input device, a player input for a wagering game;

displaying the wagering game on a display unit;

attempting to perform an operation with at least one device of one or more wagering game machine devices, the one or more wagering game machine devices including at least the player input device and the display unit;

in response to a condition of the at least one device, determining that the at least one device should be substituted with a substitute device; and

performing the operation with the substitute device instead of with the at least one device.

20. The non-transitory machine-readable storage device of claim **19**, wherein the instructions further cause attempting to perform the operation in response to receiving the player input.

21. The non-transitory machine-readable storage device of claim **19**, wherein the instructions further cause attempting to perform the operation in response to one or more other operations of the wagering game machine.

22. The non-transitory machine-readable storage device of claim **19**, wherein the condition of the at least one device is a fault condition.

23. The non-transitory machine-readable storage device of claim **19**, wherein the substitute device is selected from a group consisting of at least one other device of the one or more wagering game machine devices, at least one device of another wagering game machine, and at least one device of a network device communicatively coupled with the wagering game machine.

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